

# Bank loan-loss provisioning, central bank rules vs. estimation: The case of Portugal

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## Abstract

A fair level of provisions on bad and doubtful loans is an essential input in mark-to-market accounting, and in the calculation of bank profitability, capital and solvency. Loan-loss provisioning is directly related to estimates of loan-loss given default (LGD). A literature on LGD on bank loans is developing but, surprisingly, it has not been exploited to address, at the micro level, the issue of provisioning at the time of default, and after the default date. For example, in Portugal, the central bank imposes a mandatory provisioning schedule based on the time period since a loan is declared ‘non-performing’. The dynamic schedule is ‘ad hoc’, not based on empirical studies. The purpose of the paper is to present an empirical methodology to calculate a fair level of loan-loss provisions, at the time of default and after the default date. To illustrate, a dynamic provisioning schedule is estimated with micro-data provided by a Portuguese bank on recoveries on non-performing loans. This schedule is then compared to the regulatory provisioning schedule imposed by the central bank. © 2007 Elsevier B.V. All rights reserved.

*Keywords:* Banking regulation; Loan-loss provisions

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## 1. Introduction

Fair provisioning on bad and doubtful loans is of great importance for investors and bank regulators. Consider the merits of Basel II, the revised capital accord that would much better capture the actual risks taken by banks (Basel Committee, 2004). It is quite evident that this accord will not have much relevance if the measurement of bank capital is not satisfactory. A key input in

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the measurement of bank capital is the amount of loan-loss provisions<sup>1</sup> on bad and doubtful loans. Well-known cases of significant under-provisioning in recent history include the French Credit Lyonnais in 1993, Thailand in 1997, Japan in late 1990s (Genay, 1998), and, more recently, China. A fair level of loan-loss provisions is needed to measure bank profitability, capital, and solvency.

The issue of adequate loan-loss provisions is well recognized by central banks. In Basel II, the difference between provisions and expected loss on the loan portfolio will affect the measure of capital. In Portugal for example, the central bank has imposed a provisioning schedule on non-performing loans. Provisions increase as time elapses since a loan was declared 'non-performing'. However, the dynamic provisioning schedule is 'ad hoc', not based on empirical studies. Empirically-based measures of provisions on non-performing loans are much needed.

As bank loans are, by their economic nature, private, there is not much market-based information to assess their current value at the time of distress in many countries, so that loan-loss provisions must often be estimated. Loan-loss provisioning is directly related to estimates of loan-loss given default (LGD). A literature on LGD on bank loans is developing but, surprisingly, it has not been exploited to address, at the micro level, the issue of provisioning at the time of default, and after the default date. As the likelihood of being repaid diminishes as time elapses after the default date, a dynamic schedule of provisioning is needed. In this study, we build on a recent paper (Dermine and Neto de Carvalho, 2006) to show how to estimate a dynamic provisioning schedule. To illustrate the methodology, micro data provided by a large Portuguese bank on recoveries on non-performing loans are used to estimate a dynamic provisioning schedule, which is then compared to the one imposed by the Central Bank of Portugal.

The paper is structured as follows. The literature on bank loan-loss provisioning is reviewed in Section 2 of the paper. The provisioning schedule of the Central Bank of Portugal is presented in Section 3. The mortality-based approach to analyzing fair provisioning on bad and doubtful loans is discussed in Section 4. The data set is presented in Section 5. Empirical univariate estimates of dynamic provisioning are presented in Section 6, and these estimates are compared to the schedule of the Bank of Portugal. Finally, a multivariate statistics approach to loan-loss provisioning is developed in Section 7. Section 8 concludes the paper.

## **2. Review of the literature on loan-loss provisioning**

The accounting and finance literatures have analyzed four main provisioning issues related to private information held by banks on loans, one of the fundamental characteristics which explains the economic role of banks (Diamond, 1984): the extent of earnings and capital smoothing, the impact of reported provisions on a bank's stock returns, the systemic impact on the banking industry of disclosure on loan provisions by one bank, and the time lag between credit growth and loan losses.<sup>2</sup> This paper addresses a different issue. It provides a micro-based methodology to calculate fair provisions on bad and doubtful loans.

A series of papers have analyzed the extent of earnings and capital smoothing through a pro-cyclical loan-loss provisioning, with high provisions in good times and lower provisions in bad times. For instance, Laeven and Majnoni (2003), Hasan and Wall (2004), and Bikker and Metzmakers (2005) report empirical evidence throughout the world consistent with the

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<sup>1</sup> Note that European terminology is being used. Loan-loss provisions represent the expected losses on a portfolio of impaired loans. They constitute a contra-account, which is deducted from the value of gross loans in a balance sheet. Provisions are referred to as 'loan-loss allowance' or 'loan-loss reserves' in US bank accounts.

<sup>2</sup> See the survey on loan-loss accounting by Wall and Koch (2000).

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